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# SCIENCE

FRIDAY, MAY 22, 1914

THE SOCIAL OBLIGATIONS OF THE  
BOTANIST<sup>1</sup>

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THE subject of the address which I am to have the honor of presenting before you this evening was suggested to me on hearing recently a statement to the effect that it is the duty of society to pay for the services of the botanist. It seems to me that there is something to be said on the other side of this question, and, although my predecessors on similar occasions have almost invariably favored you with learned scientific discussions, I shall depart from that ancient and time-honored custom and invite your attention to a consideration of some of the social obligations of the botanist.

A distinguished and honored member of this society has defined botany as that science "that occupies itself with the contemplation of plant as related to plant, and with the whole vegetable kingdom as viewed philosophically—not economically or commercially in its relation to the mineral, on the one hand, and to the animal on the other." From this definition it naturally follows that a true botanist is one who is engaged in research upon plants as such without regard to the relationship they may bear to the welfare and activities of mankind. The history of botany clearly shows that botanists have ever been largely devoted to their science for its own sake, for the pleasure which they might derive from a knowledge of plants. The speculations in which they were absorbed concerned questions of truth and not those of economic values. But throughout the history of the race, the economic aspect of

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<sup>1</sup>Address of the retiring president before the Botanical Society of Washington, March 3, 1914.

plants has been of fundamental importance to man, since upon them he has ever looked not only as the chief source of the three great necessities, food, clothing and shelter, but also as the means whereby he might cure his bodily ills or otherwise contribute to his comfort and satisfaction. As society became more and more highly organized, there emerged groups of men whose interest centered upon some particular phase of plant utilization which through long-continued study and observation became sufficiently developed to be recognized as an art. The lineal descendants of these groups we recognize to-day in our practical gardeners, horticulturists, foresters, agriculturists and pharmacists. The radical difference in the point of view, between those devoted to botany as a science and those engaged in the practise of its art, ultimately led to the development of a species of class consciousness more than traces of which unfortunately are still in existence. The botanist dazzled by continued contemplation of the aphorism "science for science's sake" became unable to see any science in the practise of the art of botany, and relegated its followers to the limbo of tradesmen along with the smiths, the carpenters and the shoemakers. On the other hand, the groups interested in the practical or industrial aspects of plants came to look upon the professional botanist as a harmless individual who succeeded very well in entertaining himself, but whose activities were of little if any significance to those whose primary interest in plants was utilitarian.

This class conscious attitude on the part of those who approached the study of plant problems from such widely different points of view led to results of the most profound significance. Botanists in their zeal to preserve their ideal unsullied, and in their fear lest utility should obscure its luster

devoted themselves almost exclusively to a dendritic development of their science, the industrial branches of which remained rudimentary if they were not wanting entirely. Until within recent years, the concept of the function and content of the instruction in botany given in our colleges and universities was derived purely from a consideration of the philosophical aspect of botany. In some institutions at least the sentiment prevailed that the courses in botany planned primarily to develop the scientific attitude of mind and habits of thought, had as their chief and legitimate goal the training of students to become teachers of botany. But notwithstanding the increase in the number of institutions of learning, and the consequent multiplication of opportunities for the teacher of this subject to secure a position in which he could maintain himself in a modest way, the possibility of earning a livelihood as a teacher became more and more remote, as an increasingly large number of students graduated and became available as teachers of botany. The inevitable consequence was that many men were turned aside from the pursuit of botany as a profession and entered upon other vocations, which promised to be more remunerative.

But at length there dawned a new conception of botany, one destined not only to modify profoundly the opinion of the public at large with respect to this science, and to revolutionize in many respects the attitude of its exponents in the lecture room and laboratory, but also to pave the way for bringing into sympathetic understanding the workers in widely separated fields of botanical activity. The causes underlying the development of this new conception, which in brief is the recognition of the fact that botany may be utilitarian and still be botany—may be reduced to two, one of which is economic, and the other social.

The economic cause is to be found in the tremendous expansion of technological enterprises which is characteristic of this industrial age. Developments in the field of agriculture have created a demand for men who have been trained to deal with plants in their practical aspects. Trade and industry have recognized the value of the aid which is to be had from science, and have fostered schools for education along technical lines. In response to the demands of technology, many scientific workers have directed their attentions to practical problems, and one result of their combined labors is seen in the change of point of view with respect to botany, and the wider recognition of its utilitarian phases.

The existence of what I have called the social cause, as well as the part which it has played in reshaping the conception of the proper sphere of botany, may not be readily granted, but its absolute denial would certainly impugn the motives of many of the most devoted and conscientious workers in this field of science. This cause had its origin in the fuller realization and clearer perception of the social obligations of botanists. By social obligation is not meant the friendly association with fellow-workers, or the attendance on dinners, and dances, or afternoon receptions, but the obligation of the botanist, as a botanist, to society as a whole.

So long as botanists were economically independent, or so long as they found it necessary to rely upon some regular profession for a livelihood and devoted only their leisure hours to the acquiring of knowledge regarding plants, they could justly be held accountable only to themselves for the nature and direction of their studies. But as economic development advanced, and division of labor became more pronounced, many people of leisure and

culture found it necessary to devote their attention almost exclusively to their business affairs, and the number of professional botanists of independent means became absurdly small in comparison with the number of those who received compensation for their services. For society, recognizing that education along broad and liberal lines was of paramount importance in the up-building and perpetuation of our social institutions, has endowed professorial chairs, built commodious structures and supplied the means for securing the extensive equipment necessary for the prosecution of research and the giving of instruction as well as for the support of the teachers and investigators. Thus the economic status of the botanist changed and brought about a corresponding modification in his social obligations, which in turn led to a broader appreciation of the significance of service. Whoever accepts support from another, be that other an individual or society as a whole, does so either upon the basis of charity or upon the condition of giving an equitable return in service rendered. There is no one worthy of the name of botanist who does not scorn the former, and perhaps none who is not satisfied that he is meeting the latter condition. But who is to be the arbiter as to the equitableness or character of the service rendered? The botanist? Yes, if he is deeply imbued with a right sense of his obligation to society, but if not, if he is one of those who mistake knowledge for an end itself instead of a means to the broadening and energizing of human existence, society will sooner or later relegate him to the place now occupied by the astrologer and the alchemist. Society then has the right to demand, and it is the obligation of the botanist to render service that has a distinct and plainly discernible economic or social value. This does not mean that botanists should con-

sider plants only from the industrial point of view, but it does require the abandonment of the dogmatic attitude which has so long been hostile to any union of philosophical interest and industrial needs. It means the obliteration of the class line between the nobility of wild growing plants and the bourgeoisie of cultivated species; it means the recognition and acknowledgment by teachers and investigators that very practical and commonplace subjects, such, for example, as the germination of ordinary garden seeds, often present as profound theoretical problems as those which are far removed from the field of possible utility; it means the recognition of the principle aptly stated by a recent writer in another connection that "It is the interaction of various types of human thought and investigation, and not mutual isolation or contempt, which helps us all, while he does best who works with the profoundest theoretical problems and the most intensely practical interests at once pressing upon him, with the widest and most philosophical breadth of view, and the most faithful special labor, at once demanding attention."<sup>2</sup>

The socialization of industry and the specialization of almost every line of human endeavor has necessitated fundamental changes in the spirit and methods of education. No longer is the hope held out that more than a fraction of the students that fill our schools and colleges can win a competence in the learned professions, and large numbers must be encouraged to look for their life work in some line of activity closely associated with industry. To such of these as may choose an occupation in which practical knowledge concerning plants will be of benefit, the social obligation of the botanist is clear. He should encourage rather than discountenance in-

<sup>2</sup> Royce, J., *SCIENCE*, N. S., Vol. 38, 1913, p. 584.

vestigations of a very practical nature, relying upon his own endowment with the true scientific spirit to so shape and direct the work of his students that it may lead to the development of the desired scientific attitude of mind toward the fundamental principles of plant life. To be sure it will be objected that in such a course lies the danger that education will become a merchandise and science be degraded into a mere trade. It is feared that the time spent in learning anything which can not be turned into money will come to be considered as lost and that no longer will there be any interest in the search for truth that does not bear the earmark of utility. It seems to me, if there is any danger to the future of botanical science, that it lies in an entirely different direction, that is, in the failure to recognize the great possibilities for the development and stimulation of widespread interest in the more theoretical aspects of this subject, growing out of its relation to the material affairs of men in general, for just as our social workers have learned that religion offers poor comfort to the man whose stomach is empty, and whose body is imperfectly clothed, so botanists must come to see that their philosophy will mean little or nothing to the great mass of society unless it finds some expression along lines of human interest and necessity.

It is a social obligation of the botanist to insist that the standards by which he is to be judged shall be those of personal value rather than the standards of wealth. Measured by the latter, his position in the economic scale may be regarded as comparable with that of the wage-earner or his fellow worker in the trades, whose usefulness to society is largely measured by his ability to adapt himself to the material and often mechanical requirements under which he must perform his task. The usefulness

of the botanist, however, can not be so measured, for the service which he renders to society is of an order entirely different from that of the craftsman. His work is to explore the boundaries of knowledge in his search for additional truth, to break the bonds of tradition and opinion when they fetter progress in the solution of scientific problems, and through creative thought to advance the science of botany and its useful applications. The value of his service is not necessarily conditioned by his salary, his degrees, his hours of work or the number of his printed pages, but it does depend, in part at least, upon his open-mindedness to truth, upon his ability to direct his efforts along productive lines, upon the validity of the conclusions based upon his researches, upon the contribution which his discoveries make to social welfare, and upon his power to inspire and right to retain public confidence in the value of botanical investigations. Through his deep sense of community of interest and the recognition that his studies may be of service to all mankind, he thus places himself beyond the pale of economic class distinctions, and is entitled to be judged solely by his personal value.

Nevertheless, botanists themselves have a tendency to judge each other by standards which fall far short of those of personal value. Too often is the sign accepted at par value when the thing signified is only debased currency. An array of scholastic degrees and a long list of titles of published articles may gain for the fortunate possessor a recognition wholly disproportionate to the service he is rendering either to science or to society. The much-deplored tendency to "rush into print" on slight provocation or on no provocation at all, and the frequent occurrence of the legend "Read by title" in the proceedings of our societies and associations, is at least

presumptive evidence that judicious advertising is not without its reward to the individual irrespective of any other results that may follow. The objection which may here be made, that men who are widely separated can come to know each other's work only through their respective publications, answers itself, for the argument is entirely against setting up as standards of measurement, degrees, instead of the personal value to society of the man bearing the degree, and against regarding titles of publications rather than the merits of the publications themselves.

When scientific men overestimate the importance of its symbols to the neglect of achievement itself they give hostages into the hands of those who seem to think that scientific activity can be measured according to some fixed standard, and its value expressed in numerical terms. They also limit and restrict their usefulness to society when too much account is taken of those personal distinctions which are often made between workers in different lines of scientific activity and sometimes between those in lines which are closely related. It is necessary to emphasize the standard of personal value and to insist that a clear distinction be made between the nature of the task of the scientist and that of the industrial worker if the former is to remain free from checks and hindrances which are incompatible with true scientific progress, and if he is to be awarded recognition on the basis of his real contribution to the progress of civilization.

It is a social obligation of the botanist to be a man of affairs. The outlook for the future is that the bond between scientific investigation in botany and economic work will become closer and stronger, and that botany, already occupying an important place in the applied sciences and in human affairs, will gain even wider recog-

dition as one of the permanent forces underlying social progress and activity. Time will bring greater and more insistent demands for the extension of inquiry into every field where the application of the fundamental laws and principles developed through the scientific study of botany promises to minister to the needs of humanity. The organization and direction of the botanical work of the immediate future, in a manner that will preserve the proper balance and correlation between scientific research of the broadest and most fundamental character, and investigations undertaken largely or entirely for economic ends can be successfully accomplished by men who are not only broadly trained botanists, but who are men of affairs, as well.

Scientific progress is not accomplished by the mere accumulation of knowledge, but follows only when knowledge is communicated and brought within the grasp of all who are able to utilize it in any phase of human endeavor. The rapidity with which new knowledge makes its way and the extent to which it finds ready acceptance and assimilation depends upon the terms in which it is formulated, upon the clearness and thoroughness with which its relationship to other forms of knowledge is presented, and upon the number and variety of its possible applications which may be pointed out. Manifestly, he who will succeed best not only in securing the fullest appreciation and utilization of the results of his work, but also in obtaining merited personal recognition for his services, is he who retains a broad and liberal point of view with respect to the related branches of his science, and who is able to put himself into sympathetic relations with men who differ widely in interest and activity.

The scientific worker who would remain in the most active lines of modern prog-

ress, and who appreciates the disappointments and discouragements that often fall to the lot of one who has failed to keep in sympathetic relations with the spirit and purpose of the age in which he lives, will find it desirable not only to acquaint himself with developments in lines of scientific investigation widely separated from his own, but also to extend the scope of his mental horizon until he can obtain a clear view of the readjustments and changes which are constantly taking place in the domains of industry and education and in the fields of political and social affairs. The idea here expressed may be regarded as wholly fatuous and incapable of realization, but the fact remains that specialization alone will lead to a dendritic or tree-like development of science, which instead of conducing to general progress, will ultimately operate as a hindrance to it. Indeed, the development of a science is in many respects analogous to the evolution of a species of organisms, for just as the latter make evolutionary progress (I here quote a well-known writer on organic evolution) only through being "connected with each other by an intricate network of descent in the weaving of which the diversities of the members of a species have a definite physiological value," so will a science approximate the maximum limit to its capacity for progress only through the continuous interaction of the ideas and the integration of the principles developed in its various phases and aspects.

It is a social obligation of the botanist to study processes, to penetrate more deeply into the mighty forces of organic nature to the end that they may be brought more completely under the control and direction of man. The satisfaction of human wants is in a large degree dependent upon processes which have been slowly built up by plants through countless ages of

gradual development, and since the laws governing them are not sufficiently well understood, these processes have played a small part in the advancement of industry. We have no choice, for the most part, but to accept such products as the plant may yield, instead of being able either to fully control its activities, or having discovered the secret of its processes, to utilize them in the direct production of desired materials. The problems here involved are fundamental in character and can be solved only by scientific research of the highest order. It is not a question of applied science, but a search for the underlying principles which may lead to a full understanding of the functioning of plants, and the scientific worker who achieves success in this field will not only make a noteworthy contribution to science itself, but will also make possible profound and advantageous changes in the world of industrial affairs.

No less important than the investigation of the processes of plants themselves is the study of the processes by which they have come to be what they are. In this lies one of the most fundamental problems of modern botany, a problem which involves no less than the ultimate elucidation of the laws which have determined the evolution of the vegetable kingdom. The successful solution of this problem promises results of profound significance, and advanced workers in this line of botanical activity have predicted that the time is almost at hand when our present system of classifying plants will be supplanted through "the discovery of a system which shall depict plants in their evolutionary sequence."

The botany of the future will be more and more concerned with a study of the very recent stages in the descent of the living flora, and there can be no doubt that

this line of research will be greatly stimulated by economic considerations. The efforts to bring under control those processes by means of which improved species or varieties may be originated, will lead to a much wider study of plants, and to a critical study of their relatives from widely separated situations. In arboretums and botanic gardens as well as in the great herbariums there will be brought together collections of materials for use in the investigation of genetic relationships. For the future, it is not too much to hope or expect that in proportion as our knowledge of these relationships increases corresponding advances will be made toward a solution of some of the complex problems of evolution and heredity.

It is a social obligation of the botanist to be efficient. Stein<sup>3</sup> in his brilliant work on the philosophy of society observes that "The sense of obligation can never be derived from biology." It would seem to be self-evident that the complex facts of human life and experience can not be rightly interpreted by the same natural laws which govern the growth and development of a biological organism, although the latter view has not been without its exponents and followers. But public opinion, though long suffering, can not be depended upon to forever countenance those scientific workers whose attitude toward society is expressed by the old doctrine, "mind your own business," and whose rule of conduct recognizes no influence or appeal that lies beyond the limits of their science. The service of highest efficiency, however, will be rendered by those who through experiment, observation and generalization, succeed in dispelling the mists of shadowy suggestion which have prevented a clear view of many facts of nature, and who at

<sup>3</sup> Stein, "Die soziale Frage im Lichte der Philosophie," 1897, s. 222.



the same time prepare the way for their widest application and utilization.

The efficiency of the scientific worker bears a very direct relation to the motives which guide him in his work. The temptation to follow the line of thought or study that for the time appears most attractive is very great and for some irresistible, and advance in one direction proceeds only until a new and more inviting path is crossed, but the scientist who pursues such a wavering course is apt to be like the aeronaut, very much in the air. The most effective workers are those who have the greatest power of sticking to a subject until every means of forcing the truth to reveal itself has been exhausted. As the necessity increases for a general attack upon the more difficult and fundamental problems, the greater is the demand for patience and perserverance in the prosecution of investigation. The homely, but expressive saying, "It's dogged as does it," which was often quoted by Darwin, illustrates a mental characteristic which has led many a man to overcome apparently insurmountable difficulties.

It is also easy to fall into the error of assuming that the collection of data is science and that whoever actively and industriously accumulates a large collection of observations on various natural phenomena thereby contributes largely to scientific progress. But the application of thought in lines that lead to definite and tangible results, and the collection of data to some useful purpose, "will always have as their guiding motive the testing of some tentative hypothesis needed for the explanation of our experience." The shelves of our libraries bear many a musty tome in which are recorded countless observations on the phenomena presented by plants, but many of these observations have little meaning for science to-day either because they

were not made with sufficient discriminating care and precision to give them scientific accuracy, or because they lacked the correlation with well established facts necessary to their interpretation in harmony with later discoveries. Other observations have remained in oblivion or conscious neglect, either because of the accident of their place of publication or because they did not appear in one of the "recognized" mediums of scientific utterance. It seems reasonable to assume that the scientific accuracy or validity of published observations or conclusions depends upon the efficiency of their author rather than upon the place of publication. Those who regard a restricted group of books and journals as a canon to which alone they look for authentic scientific utterance, and regard all others as apocryphal do but perpetuate the ancient schism between the botanists, on the one hand, and the gardeners and horticulturists on the other.

Efficiency implies not only a wide knowledge of facts, but also a breadth of view which will enable the relations between various categories of facts to be seen clearly. How the lack of understanding of the known phenomena and facts may operate to retard the diffusion of knowledge is well illustrated by the failure of contemporary scientists to understand and accept the discoveries of the early plant breeders. While the gardeners were making discoveries the importance of which was not recognized until nearly a century later, the real scientists were occupied with the recognition and classification of species. The failure of botanists to give credence to the early investigations in plant breeding has been variously explained, but we may well accept the view of Focke<sup>4</sup> that "these discoveries did not fit into the idea of nature then

<sup>4</sup> Focke, W. O., "Die Pflanzen-Mischlinge," 1881, s. 433.

current, for they could not be reconciled with the known facts and therefore were disregarded."

The obligation to be efficient in the avoidance of error is by no means to be taken lightly. The young writer who excused his carelessness of statement and inaccuracy of citation by saying "everybody makes mistakes" no doubt uttered a truism, but he also displayed his profound ignorance of the difficulty with which a misstatement is rectified when once it has gained a footing in literature. There is perhaps no more striking example of the strange fabric that may be woven with the warp of truth and the weft of oversight or error, than the biological principle known as Von Baer's law.

Von Baer is renowned as the originator of the theory that the embryo of every higher animal during its development passes through successive stages in which it simulates the adult forms of the lower animals in the same phylogenetic series. But Von Baer did not originate this theory, indeed he was its most vigorous opponent. What he really taught was that the embryos of different animals are similar to each other in that they adhere to the same plan of development, but through the failure of some of his contemporaries to be precise and discriminating, the ideas of another man were mistaken for those of Von Baer, and the latter was thereby placed in a false light in respect to the contribution which he made to science.

Manifestly a high degree of efficiency is just as desirable in interpreting and citing the writings of other workers, as it is necessary in planning and successfully conducting the work of experimentation, and the scientific worker who renders the best service both to himself and to his science will be as zealous in avoiding the perpetua-

tion of error as he is ardent in his search for truth.

It is a social obligation of the botanist to strive for a better organization of his science. It is not my intention to raise that much-discussed question "What is botany?" the answers to which are approximately as numerous as those who are or who think themselves botanists, although I deprecate the contrariety of opinion which exists with respect to what may properly be included in the domain of this science. Some maintain the old distinction between pure and applied science, and would exclude from the science of botany such subjects as plant breeding, economic botany and plant pathology; others think botany is largely an applied science, consisting in part of mere applications of other sciences; some conceive the science as largely restricted to one of its phases, as, taxonomy, morphology or physiology; and still others maintain that botany is not a single science but a group of distinct sciences with nothing in common except the fact that they are concerned with the phenomena presented by plants.

Segregation and specialization in various lines of botanical activity seem to be a natural process necessarily attendant upon scientific progress. Competition between these lines, each of which seeks to gain the ascendancy, and to become recognized as the true representative of the science, also seems not only natural, but necessary to normal and progressive development. There exists, however, a sufficiently close analogy between the evolution of a science and certain phases of organic development to justify the consideration of a well-established biological principle in discussions of the relative importance of different branches of the science, or the promise which they hold out of contributing most to its advancement. This prin-

ciple states that "the point of departure of the progressive lines of one period of time has not been from the terminal types of the lines of preceding ages, but from points farther back in the series." The evidence is not wanting that the new and progressive lines of botanical activity do not originate directly from the most highly specialized branches of the science, but from the more unspecialized portion. Thus arose ecology, pathology and genetics, and so doubtless will the future see the origin and development of other important and vigorous branches of this science.

It seems inevitable that from time to time each branch of the science will pass through eras of reconstruction unless, indeed, "it is assumed that the existing order is a closed system within which men can and should rationalize their conclusions, but only within that system and ever under its authority." But such a philosophy is incompatible with the modern spirit of progress, which is constantly utilizing accumulated experience in the development of new points of view and demanding a frequent readjustment of the relations existing between allied lines of investigation. The organization of the science, however, implies much more than the harmonious adjustment of relations between its various branches, or agreement as to their proper sphere of activity. It requires that botanists realize that their duties are not fulfilled by investigation alone, but that there is also incumbent upon them the obligation to give serious consideration to what for want of a better term may be called the business affairs of the science. If the great body of investigational work now in progress is to have continued growth and opportunity for unrestricted expansion, the means must be forthcoming to provide for its support, and to assure the protection of its interests. Society must be looked to

as the source of these means, and how freely they are given and what restrictions or limitations are imposed with respect to the manner in which they are to be applied will depend largely upon the degree to which there is developed in the public at large a sympathetic appreciation of the aim and purpose of the science of botany.

It is relatively easy to obtain financial support for a scientific enterprise which promises speedy returns in kind, but when the energy expended in such an enterprise is devoted solely to securing showy and immediately practical results, then does scientific education become a mere matter of merchandise and science itself is degraded to the level of a trade. Public support to scientific enterprise must be secured on some other basis than that of annual dividends. Results of great and permanent benefit to society may rightfully be expected, but they must be looked for in the better understanding of the forces of nature and their application to the promotion of human welfare, in the development of constructive habits of thought, which tends to forecast the future by an analysis of the facts of the present, and in the social progress which will be favored by a clearer perception of the relations existing between plants and man.

It is fruitless merely to affirm that more attention should be given to the claims of science, or to condemn the non-scientific classes for estimating the importance of scientific work according to its money value. I am persuaded that the much-deplored tendency to look for immediate and practical returns from scientific work is due less to crass and sordid motives than to a lack of right understanding of the manifold ways in which science exerts a beneficent influence upon the affairs of men. This disability, however, is not beyond remedy, and will be much less in evidence

when greater attention is given to the education of the individual along lines which will lead to a better perception of the real meaning of science. Organization and unity of spirit and purpose directed to the scientific education of the public are essential if practical men are to be brought to see that their interests will be furthered by encouraging scientific work and if society is to be depended upon for its liberal support.

Finally, it is an obligation of the botanist to recognize the beneficent influence of personal association. The inspiration gained by participation in the annual meetings of our scientific societies and associations is too well appreciated to need elaboration or comment. Similarly, the importance of the close personal relation between the student beginning research and his instructor is clearly understood. But it is of the possibilities which lie in the closer personal association between the junior and the senior members of this society that I would speak. It is sometimes said that the younger generation is inclined to be dogmatic, self-sufficient and somewhat disregardful of the wisdom and knowledge acquired by their elders. If this be true, it is largely because the printed page has been substituted for the more natural means of communication between individuals. But the printed page transmits very imperfectly the intangible something we call personality, that power to kindle in others the fire of enthusiasm, to develop that point of view which leads to creative thinking, and to point the path to that insight and vision which has been attained by those of ripper wisdom. The younger generation needs the personal inspiration and guidance which it is within the power of their elders to give, nay, more, they stand alert and expectant awaiting the time when their natural leaders may signify their will-

ingness to give them counsel and instruction. When the senior members of this society raise the banner of wisdom and experience, and sound the assembly call, they will find their juniors quick to desert the paths which, like those in a woods, end nowhere, or which lead over the heights of purely intellectual gratification, or through the picturesque valleys of individualism, and, rallying to their standard, be content to march together along the broad road of co-operation, and united effort, which ultimately leads to the heights of progress. And then when our leaders shall approach the end of life's journey, they will have the satisfaction of knowing that although their printed works may soon be superseded or sink into oblivion, the influence of their inspiration and personality, perpetuated through their friends and fellow-workers, will endure for all time.

W. W. STOCKBERGER

U. S. DEPARTMENT OF AGRICULTURE

#### PREMEDICAL EDUCATION

IN Cincinnati on January 17, 1914, a conference was held under the auspices of the faculty of medicine of the University of Cincinnati. Representatives of many medical colleges and of academic institutions had been invited to be present at the meeting and to participate in the discussion upon what has been called, very widely, "premedical education." The object of this conference was to draw together the academic and medical institutions for the sake of more satisfactory preparation of students for medicine.

In opening the conference the chairman spoke as follows:

In a lecture to his students in 1821, Dr. Graves said that the practise of medicine can not be taught or learned by hearsay. Later in his introductory lecture at the opening of the session of 1837-38 he enlarged upon his former remarks, and said: "No profession requires a sounder preliminary education than ours, and in none ought education to be more studiously directed to promote